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FORCE OF GRAVITY AT MT. HAMILTON AND SAN FRANCISCO.

Mr. E. D. PRESTON of the U. S. Coast and Geodetic Survey has published his report on gravity determinations in the Pacific Ocean (*Bulletin* No. 11, U. S. C. and G. S., 1889). The force of gravity at Washington being 1.000000, that at San Francisco (Professor DAVIDSON'S Observatory) is 0.999854 and at the Lick Observatory it is 0.999544. Determinations of g at four stations in the Hawaiian Islands and for a station at Caroline Island are also given. E. S. H.

LICK OBSERVATORY PHOTOGRAPHS OF THE MOON.

Knowledge for October 1, 1889, contains an article by the editor (Mr. RANYARD), on the Moon as seen in the Lick Telescope. Excellent reproductions of five silver prints made by the Direct Photo-Engraving Company of London, accompany the article. Mr. RANYARD'S remarks upon the temperature of the moon and upon the possibility of the existence of snow-fields on its surface, are well worth close attention. E. S. H.

AMERICAN ECLIPSE EXPEDITION TO AFRICA (DECEMBER 21, 1889).

The New York *Sun*, for October 17, has an account of the sailing of the U. S. S. *Pensacola* with the American Eclipse Expedition to Africa. The expedition is under Professor D. P. TODD, of Amherst College, as chief astronomer. His astronomical assistants are Messrs. BIGELOW, DAVIS and JACOBI. Mr. CARBUTT goes as photographer, with Mr. WRIGHT as his assistant; Mr. E. J. LOOMIS as naturalist; Professor ABBE as meteorologist, with G. E. VAN GUYSLING as assistant; Mr. PRESTON as the observer of magnetics and for determinations of gravity; Mr. W. H. BROWN as osteologist and naturalist, with his brother as assistant; Mr. ORR as ethnologist and ornithologist; H. CHATELAINE as interpreter; G. T. FLINT as stenographer, and Dr. BARTLETT as apothecary! Add to these names that of Professor ALEX. AGASSIZ, who may join the vessel at Cape Town to engage in deep-sea dredging. This is carrying the war into Africa, indeed. The newspaper account of the astronomical outfit is somewhat meagre. It appears that the expedition is provided with a photoheliograph, giving an image of the sun four inches in diameter. With this the partial phases will be photographed on *ortho-chromatic* plates (No. 16) and the total phase on *ortho-chromatic* plates (No. 27). A large mirror, belonging to Professor LANGLEY, an equatorial belonging to the Harvard College Observatory, and *twenty* cameras are also provided for photography.

It is to be hoped that the expedition will meet with fine weather, in order to utilize its unusually large force of observers and instruments. Sir ISAAC NEWTON said at the death of his pupil COTES, "If COTES had lived, we should have known something." If the four minutes of totality are clear at St. Paul de Loando we shall certainly learn something from these many skilled observers with their large equipment.

It now appears that with two expeditions in Africa, and with two at least, in America, the observation of this eclipse is thoroughly well provided for. It should be a source of gratification to Californians, and especially to this Society, that the generosity of one of our members has allowed the Lick Observatory to put a strong expedition in the field.

E. S. H.

October 26, 1889.

ECLIPSE OF *JAPETUS*, THE VIII SATELLITE OF *SATURN*, ON NOVEMBER 1, 1889.

The eclipse of *Japetus* was observed here on November 1 with the twelve-inch equatorial. Only a part of this very rare phenomenon was visible at this point, the interval between the rising of *Saturn* and daylight covering only a small portion of the time occupied by the eclipse, or, rather, series of eclipses; for the satellite passed through the shadow of the entire ring system as well as that of the globe of *Saturn*. The satellite would first pass into the outer edge of the shadow of the ring, and would next appear in the sunlight, shining through the CASSINI division, being visible for probably eighteen minutes. It would then pass into the shadow of the inner bright ring; from this it would emerge in the semi-shadow of the Crape Ring, from which it would pass into the sunlight again between the shadow of the Crape Ring and that of the ball. It would next enter the shadow of the ball, and, from this point on, a reversal of all the first phenomena would happen. The entire series of eclipses covered a period of approximately nineteen hours. That portion of the eclipse which could be seen from the Lick Observatory was the reappearance from the shadow of the globe and passage through the semi-shadow of the Crape Ring into the shadow of the inner bright ring.

The important questions in connection with this phenomenon